Remarks

Applicants respectfully request reconsideration of the rejection of the claims in view of the above amendments and the remarks set forth below. Claims 1-20 remain in the application. Claims 1-20 were previously presented.

35 U.S.C. §103

Claims 1-20 stand rejected under 35 U.S.C. 103 (a) as being unpatentable over Griffits (US 6,262,776 B1) in view of Sackstein et al. (US 6,744,815 B1). Under U.S.C. § 103, the prior art reference (or references when combined) must teach or suggest all of the claim limitations (MPEP § 706.02(j)). Claim 1 is recites, inter alia, a "system that maintains synchronization between a video signal and an audio signal that are processed using audio and video clocks that are locked, the system comprising...a component that determines an initial audio input buffer level...a component that determines an amount of drift in the initial audio input buffer level and adjusts the locked audio and video clocks to maintain the initial audio input buffer level if the amount of drift reaches a first predetermined threshold...and a component that measures a displacement of a video signal associated with the audio signal in response to the adjusting of the locked audio and video clocks and operates to negate the measured displacement of the video signal if the measured displacement reaches a second predetermined threshold." The claimed "locked audio and video clocks" and "adjusts the locked audio and video clocks" elements of claim 1 are an important aspect of Applicants' invention. As discussed in the BACKGROUND OF THE INVENTION (page 1, ln. 20 – Page 2, ln. 2):

> Some audio/video receiver modules, which may be incorporated into display devices such as televisions, have been designed with an audio output digital to analog (D/A) clock that is locked to a video output D/A clock. This means that the audio clock and video clock cannot be controlled separately. A single control system may variably change the rate of both clocks by an equal percentage. In some of these systems, a clock recovery system may match the video (D/A) clock to the video source analog to digital (A/D) clock. The audio output D/A clock may then be assumed to match to the audio source A/D clock. This assumption is based upon the fact that broadcasters are supposed

> to similarly lock their audio and video clocks when the source audio and video is generated.
>
> Although the Advanced Television Systems Committee (ATSC) specification requires broadcasters to lock their video source A/D clock to their audio source A/D clock, there have been instances where these clocks were not locked. Failure of broadcasters to lock the clock of transmitted audio source material with the clock of transmitted video source material may result in a time delay between when the audio presentation should be occurring and when the audio is actually presented. This error, which may be referred to as lip synchronization or lip sync error, may cause the sound presented by the audio/video display device to not match the picture as it is displayed. This effect is annoying to many viewers.

Furthermore, as discussed in DETAILED DESCRIPTION (page 8, lns. 25-35):

> At block 204, the initial audio input buffer level is determined. Over time, the amount of drift of the initial audio input buffer level is determined, as shown at block 206. If the drift exceeds a first predetermined threshold (208), then the locked clocks of the video D/A converter 32 (FIG. 1) and the audio D/A converter 34 are adjusted in the direction that maintains the initial audio input buffer level.
>
> In response to the adjustment of the clocks, the displacement of the video signal is measured, as shown at block 212. If the displacement of the video signal exceeds a second predetermined threshold (214), then the measured displacement of the video signal is negated (block 216) by, for example, restarting the process or dropping a video frame to improve synchronization. At block 218, the process ends.

In other words, the claimed invention, as set forth in claim 1, is directed towards a system that maintains synchronization between a video signal and an audio signal that are processed using locked audio and video clocks. If a predetermined amount of drift between audio and video is detected (by observing a change in the initial audio input buffer level), the locked audio and video clocks are adjusted to maintain the initial audio input buffer level. If the video signal is displaced too much (i.e., exceeds a second predetermined threshold) due to the adjustment of the locked audio and video clocks, the displacement of the video signal is negated by, for example, restarting the synchronization process or dropping a video frame from the video signal.

Griffits appears to disclose a system and method for maintaining synchronization between audio and video by playing video frames early, dropping video frames or delaying the playing of video frames. (See, e.g., col. 12, lns. 28-40 and 56-64; col. 15, lns 39-42; col. 16, lns. 38-45) In other words, Griffits appears to only disclose adjusting the display of video data and not adjusting locked audio and video clocks in order to maintain synchronization between audio and video data. Indeed, as acknowledged in the Office Action Griffits does not disclose the use of locked audio or video clocks.

Sackstein et al. appears to disclose a method for synchronizing and encoding audio and video streams. The Office Action proposes that Sackstein et al. teaches the use of locked audio and video clocks. Applicants respectfully disagree. Sackstein et al. specifically states that the "video clock 122 need not be locked to the audio clock 112." (Col. 8, lns. 20-21). If the audio and video clocks 112 and 122 happen to be in synch or "locked", then audio frames and video frames removed from buffers 118 and 128 will have approximately the same decoding time stamp. (Col. 9, lns. 4-39). However, if the audio and video clocks 112 and 122 are not synchronized or locked (i.e., the video clock is running faster or slower than the audio clock), the encoding system 100 detects the loss of synchronization and operates to increase or decrease the number of audio samples provided to buffer 118. (Col. 9, ln. 40 – col. 10, ln. 5). More specifically, Sackstein et al. appears to teach an audio compressor 116, positioned after the audio clock 112, that decreases (e.g., drops) audio samples or increases (e.g., repeats) audio samples in a buffer 115 when there is a loss of synchronization between the audio and video clocks 112 and 122. (Col. 8, lns. 30-60).

Further, the examiner has indicated in the most recent Office Action that Sackstein et al discloses two aspects of audio and video clocks, one in which the audio and video clocks are locked and one in which the audio and video clocks need not be locked. The examiner also indicates that Sackstein et al discloses that "If DIFFos is positive (as is the case in the example above) the controller deduces that the video clock is effectively running faster than the audio clock. In this case the number of audio samples should be increased to effectively speed up the audio clock. If DIFFos is negative the controller deduces that the video clock is effectively running slower than the audio clock. In this case the number of audio samples should be

decreased to effectively slow down the audio clock." (col. 9 lines 54-62). However, it appears that the above refers to the aspect in Sackstein et al for operation when the audio and video clocks are not locked. Sackstein et al appears to indicate, with respect to the aspect of locked video and audio clocks, "when the audio clock 112 and video clock 122 are locked, the ratio between the number of video frames in buffer 128 and the number of audio frames in buffer 118 is a constant and equal to $RATIO_{sampled}$." (col. 9 lines 35-39) Sackstein et al goes on to indicate that if "one of the encoders (e. g. video encoder 120) speeds up, then it will begin to produce more frames. The operation of the multiplexer does not change despite the change in the video clock and therefore the additional video information will accumulate in buffer 128." (col. 9 lines 41-45). It is at this point that the error value DIFFos is introduced. Sackstein et al appears to teach that when the audio and video clocks are locked, no action, such as adjusting the locked audio and video clocks or operating to negate the measured displacement of video, is necessary. Corrective action is only necessary when the video and audio clocks are effectively unlocked. Indeed, not only does Sackstein et al not appear to show or teach the claimed "adjusts the locked audio and video clocks", Sackstein et al appears to teach away from the concept that any adjustment of the locked audio and video clocks is necessary if the audio and video clocks are locked. No additional action, such as operating to negate the measured displacement of video is necessary when the audio and video clocks are locked because, as the examiner has indicated, corrective action is taken when the video clock is effectively running faster or slower than the audio clock. A person looking to address the problem associated with maintaining synchronization between a video signal and an audio signal that are processed using audio and video clocks that are locked as described in the present invention would not find the solution by looking at the aspects related to locked audio video clocks found in Sackstein et al. As a result, Sackstein et al., like Griffits, does not appear to teach or suggest at least the claimed "adjusts the locked audio and video clocks" elements of claim 1.

Applicants are unsure what the combination of Griffits' system and Sackstein's unlocked video and audio encoding clocks and Sackstein's audio compression process would result in, however, Applicants' respectfully propose that such a combination would fail to teach or suggest the "system that maintains synchronization between a video signal and an audio

signal that are processed using audio and video clocks that are locked, the system comprising...a component that determines an initial audio input buffer level...a component that determines an amount of drift in the initial audio input buffer level and adjusts the locked audio and video clocks to maintain the initial audio input buffer level if the amount of drift reaches a first predetermined threshold...and a component that measures a displacement of a video signal associated with the audio signal in response to the adjusting of the locked audio and video clocks and operates to negate the measured displacement of the video signal if the measured displacement reaches a second predetermined threshold" limitations of claim 1. Therefore, it is respectfully proposed that the rejection of claim 1 under 35 U.S.C. § 103(a) is overcome in accordance with the above amendment and remarks and notice to that effect is earnestly solicited.

Dependent claims 2-6 being dependent on and further limiting independent claim 1, should be allowable for that reason, as well as for the additional recitations that they contain. Applicants respectfully requests reconsideration of the rejection of the claims in view of the above remarks.

Independent claim 11 contains elements similar to independent claim 1 and should be allowable for the reasons discussed above. Therefore, it is respectfully proposed that the rejection for obviousness is overcome.

Dependent claims 12-14 being dependent on and further limiting independent claim 11, should be allowable for that reason, as well as for the additional recitations that they contain. Applicants respectfully requests reconsideration of the rejection of the claims in view of the above remarks.

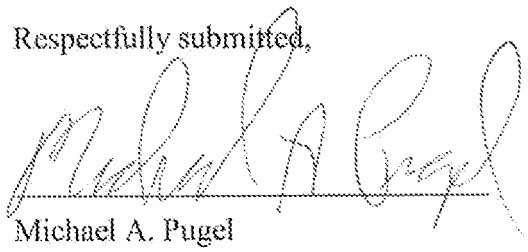
Independent claim 15 contains elements similar to amended independent claim 1 and should be allowable for the reasons discussed above. Therefore, it is respectfully proposed that the rejection for obviousness is overcome.

Dependent claims 16-20 being dependent on and further limiting independent claim 15, should be allowable for that reason, as well as for the additional recitations that they contain. Applicants respectfully requests reconsideration of the rejection of the claims in view of the above remarks.

Having fully addressed the Examiner's rejections it is believed that, in view of the preceding remarks, this application stands in condition for allowance. Accordingly then, reconsideration and allowance are respectfully solicited. If, however, the Examiner is of the opinion that such action cannot be taken, the Examiner is invited to contact the Applicants' attorney at (818) 260-3727, so that a mutually convenient date and time for a telephonic interview may be scheduled.

No fees, other than those discussed above, are believed due. However, if a fee is due, please charge the additional fee to Deposit Account 07-0832.

Respectfully submitted,



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